**Before The**
**Federal Communications Commission**
**Washington, D.C. 20554**



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| In the Matter of | ) | |
| | ) | |
| Amendment of the Commission's Rules | ) | CC Docket No. 90-314 |
| to Establish New Personal Communications | ) | ET Docket No. 92-100 |
| Services | ) | |

COMMENTS

Persuant to Section 1.415 of the Commission's Rules, CNet, Inc. hereby submits its comments on the above-captioned Notice of Proposed Rule Making and Tentative Decision ("NPRM").

## I. INTRODUCTION

CNet is a leading provider of advanced technical software and engineering services to licensees, operators, and infrastructure equipment manufacturers in the wireless communications industry. CNet has been active in the design, implementation, and management of cellular, land mobile, and mobile data systems in the United States and abroad. It has invested significantly in research, development, and deployment of new applications and services for advanced wireless and personal communications technologies and systems.

CNet supports prompt adoption of rules governing PCS so that these services can be offered to the public in as timely a manner as possible. In general CNet supports the rules proposed in the NPRM. Specifically, CNet herein addresses the technical aspects of the rules proposed in the NPRM as they pertain to propagation prediction and depiction.

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In particular, CNet comments on the following issues:

- Proposed Section 99.5 - Definitions.
- Proposed Section 99.407 - Power/antenna height limits.
- Proposed Section 99.409 - Field strength limits for the 1850-1895 MHz and 1930-1975 MHz bands.
- Appendix F - PCS-Fixed Microwave Interference Calculations.

CNet believes that the proposals put forth in the NPRM will be most effective if the Commission will:

(1) Adopt low power and antenna height limits;
(2) Specify the method to be used for determination of service area;
(3) Specify the method to be used in determining the geographic location(s) of mobile and portable units for calculations of potential interference into existing microwave receive facilities.

## II. DISCUSSION

### Part 99

#### 1. Average Terrain

Proposed Section 99.5 defines Average Terrain as "the average elevation of terrain between 3.2 and 16 kilometers from the antenna site." The use of terrain between 3.2 and 16 km is clearly inappropriate for small service areas (less than 3.2 km, and on the order of 500 meters in the case of certain experimental Personal Communications Service (PCS) systems being tested today). A general industry consensus holds that PCS systems, when fully implemented, will employ low power and low antenna centerlines, and will be characterized by small base station service areas.

In cases such as this, where the service area of the base site is substantially less than the closest terrain point, an alternate method of determining average terrain should be used. Use of terrain points that are less than 3.2 km is one possibility.

2. Field Strength at Service Area Boundary

Proposed Section 99.409 (a) states that the licensee of a personal communications system shall limit "The field strength at its service area boundary to a median value of 47 dBμ." The exact method of determining this field strength and depicting the boundary is not specified. However, the proposed rule implies the use of a Carey or CCIR based study.

CNet recognizes the need for a single, repeatable method to identify service areas for the purpose of evaluating license applications. The Commission must establish such a baseline standard for determining the extent of service area coverage.

In formulating this standard, the merits of using contour based studies must be considered. PCS applicants and operators likely will identify actual service areas through the use of advanced signal propagation methodologies. These methodologies will address factors, such as local topography vegetation and the geographic distribution of users, that are not adequately treated in contour based studies.

When considering a spread spectrum system, for example, the actual coverage from a base site decreases as the number of users increases. The geographic distribution and number of users is an integral part of determining the service area of a site employing spread spectrum technology.

As is the case under Part 22 for cellular licensees, alternate showings in cases where a contour method is clearly inappropriate should be permitted. Use of these alternate methodologies would

address discrepancies between actual service areas and those that are likely to be predicted by contour methods for very small base station service areas.

CNet recommends that the Commission specify the method(s) to be used in calculating the "median value of 47dBμ" for filing purposes. A technically accurate method for determining a service area boundary should address factors such as local topography, vegetation and the geographic distribution and number of users. Specific language regarding the use of alternate methodologies, under appropriate circumstances, should be included.

3. Height Power Limitations

In Proposed Section 99.407 (a), the Commission contemplates ERP limits for on the order of 1 kW, and antenna heights above average terrain (HAAT) on the order of 1000 feet for PCS operations.

The proposal limits contemplate high-power rather than low-power PCS operations. Until PCS fully matures, it is anticipated that these services will be predominantly located in highly urbanized, densely populated areas where low power systems will be established. Accordingly, experimental and trial systems have implemented low-power configurations. The potential for sharing of spectrum with existing microwave users also will be greatly decreased with the higher centerlines and powers.

Adoption of height/power limits on the order of 1000 watts and 600 meters will enable more efficient coverage in rural areas as PCS matures. However, to meet the anticipated near-term needs of PCS, CNet recommends that the Commission adopt the height/power limits as described in Paragraph 115, i.e. 10 watts and 91 meters for systems operating in the 1850-1895 MHz and 1930-1975 MHz bands.

Appendix F

1. Mobile Stations

In calculating the potential for interference from mobile units to a fixed microwave receive location, the Commission suggests "The contribution from the mobile stations is determined by first calculating an equivalent effective isotropic radiated power (EIRP) for the mobiles nominally associated with each base station." The geographic location of the aggregate Mobile EIRP for purposes of calculating path loss and hence interference is not specifically identified. To assume that the aggregate EIRP is emanating from the base site location, for instance, is not realistic because mobiles will be distributed throughout the service area.

One method for geographically distributing potential users in a realistic manner entails the use of "centroids" that represent the probable location of a mobile (or portable) station. A centroid is defined as discrete fixed geographic point that represents the probable location of mobile or portable stations. The locations for the centroids can be determined by market studies and will tend to be more densely concentrated in urban areas and (in the case of mobile units) to be distributed along roadways.

The essence of the distributions is to place projected use where it is most likely to occur instead of homogeneously allocating demand over an entire service area, or assuming that all users are co-located with the base site. A degree of randomness and statistical validity can be afforded by using a Monte Carlo approach to selecting the locations as opposed to manually generating the centroid locations. The use of such a method for randomly distributing vehicular and portable traffic geographically and then using the probable locations to calculate potential interference into existing microwave receivers technically will be superior and more empirically valid than calculating an aggregate EIRP and assuming that the combined power is emanating from a single (base site) location. Accordingly, it is recommended that the Commission explicitly

adopt a methodology based upon distributing the geographic location(s) of mobile units with respect to interference into existing microwave receive facilities.

To determine interference from mobile and portable units, the Commission invites comment "concerning the appropriate model(s) for calculating propagation losses in urban and suburban built up areas, especially those involving low antenna heights." As stated in CNet's comment in the matter of *Amendment of Part 22 of the Commission's Rules to provide for filing and processing of applications for unserved areas in the Cellular Service and to modify other cellular rules (CC Docket No. 90-6)*:

> "The Commission's rules should ... permit applicants or licensed system operators to submit ... detailed prediction techniques that:
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> a. are based on the system engineering methods actually relied upon by the applicant or system operator, and are substantially corroborated by methods published and readily available in the public domain; or,
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> b. are substantially corroborated by field measurement data."

CNet proposes that the Commission permit applicants and operators to use propagation methodologies without disclosing supporting proprietary data. The validity of the methodology must be corroborated by passing the criteria outlined above.

2. Portable stations

Portable aggregate EIRP should be handled in the manner recommended above for mobile stations.

Weighting factors provide a novel approach to a difficult problem. The values of 20 dB of additional attenuation for urban

buildings and 10 dB of additional attenuation for single family homes are reasonable. Depending upon the model(s) being used, an upward weighting factor may or may not be appropriate.

The appropriate worst case assumption from a balcony or roof would be that the path between interferer and victim receiver is line of sight, in which case a free space loss formula would be adequate.

## III. RECOMMENDATIONS

CNet recommends that the Commission:

- Adopt the height/power limits as described in Paragraph 115, i.e. 10 watts and 91 meters.

- Specify the preferred method to be used in determining and depicting the 47 dBμ service area boundary. Alternate propagation studies for determining geographic service area should be permitted as long as the method can be corroborated.

- Specify the method to be used in determining the geographic location(s) of mobile/portable units in interference calculations. Adoption of the centroid methodology described above for determining the geographic location of aggregate mobile and portable stations would be technically preferable.

- Adopt the procedures described in Appendix F for portable stations without specific building/height weighting factors.

## IV. CONCLUSION

CNet supports conceptually the Commission's proposals. By adopting the recommendations set forth herein, the Commission will be in a better position to achieve its intent of "ensuring that all mobile services are provided with the highest quality ..." from a technical standpoint.

Respectfully submitted,

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